Forth in the Computer Numerical Control Environment

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ABSTRACT

In order to help students grasp the concepts of computer-aided manufacture, a small Computer Numerical Control (CNC) workstation was built. It consists of a microcomputer, a vertical mill, a plotter, a printer and necessary interface electronics. The workstation may be controlled by means of either a FORTH-based control language or a CNC language closely following the standards of EIA RS-358-B.

Although the capacity of the mill is small and the resolution of the system is not consistent with industry standards, the workstation provides students with the desired experiences and also serves as a physical demonstration of the potential of FORTH.

The development of this workstation was greatly facilitated by the use of FORTH. FORTH-79 was used to test electronic driver and interface circuits, control the plotter and mill, form a basis for the FORTH-like control language, and implement the EIA standard CNC language. In addition, since the CNC languages are imbedded in FORTH, the support features of the FORTH system are available to the user.

The inherent transportability of FORTH together with a hierarchial modular design result in an implementation that is almost totally hardware independent and very flexible. As a result, this project serves as an extensive demonstration of the utility of the integrated FORTH environment in CNC applications.